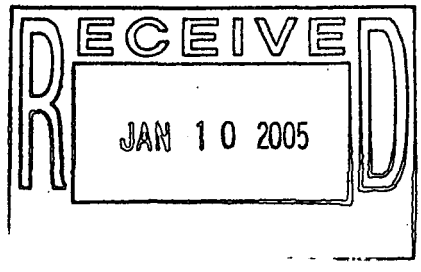
Data Summary Report for IHSS Group 400-5

IHSS 400-205 – Sump #3 Acid Site
PAC400-813 – RCRA Tank Leak in Building 460
PAC400-815 – RCRA Tank Leak in Building 460

Approval received from the Colorado Department of Public Health and Environment
December 7, 2004 IA-2497
Approval letter contained in the Administrative Record



December 2004

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ENCLOSURE

Compact Disc Containing Standardized Real and QC Data

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ACRONYMS

AAESE	Accelerated Action Ecological Screening Evaluation
AL	action level
AR	Administrative Record
ASD	Analytical Services Division
bgs	below ground surface
CAS	Chemical Abstracts Service
CD	compact disc
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
CRA	Comprehensive Risk Assessment
DOE	U.S. Department of Energy
DQA	Data Quality Assessment
DQO	data quality objective
EPA	U.S. Environmental Protection Agency (same as USEPA)
ER	Environmental Restoration
ft	foot or feet
FY	Fiscal Year
HPGe	high-purity germanium
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
ISOCS	In-Situ Counting System
K-H	Kaiser-Hill Company, L.L.C.
LCS	laboratory control sample
µg/kg	micrograms per kilogram (shown on maps as ug/kg)
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NFAA	No Further Accelerated Action
PAC	Potential Area of Concern
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
pCi/g	picocuries per gram
ppm	parts per million
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement

RFETS or Site	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RIN	report identification number
RL	reporting limit
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SD	standard deviation
SOR	sum of ratios
SSRS	Subsurface Soil Risk Screen
SVOC	semivolatile organic compound
SWD	Soil Water Database
TCLP	Toxicity Characteristic Leaching Procedure
USEPA	U.S. Environmental Protection Agency (same as EPA)
V&V	verification and validation
VOC	volatile organic compound
WRW	wildlife refuge worker
%REC	percent recovery

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1.0 INTRODUCTION

This Data Summary Report summarizes accelerated action characterization conducted at Individual Hazardous Substance Site (IHSS) Group 400-5 at the Rocky Flats Environmental Technology Site (RFETS or Site) near Golden, Colorado. These activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001) and IASAP Addendum #IA-03-14 (DOE 2003). Results are compared to wildlife refuge worker (WRW) action levels (ALs) described in the Rocky Flats Cleanup Agreement (RFCA) (DOE et al. 2003). Potential ecological risk associated with the results will be evaluated in the Accelerated Action Ecological Screening Evaluation (AAESE) and the ecological portion of the Sitewide Comprehensive Risk Assessment (CRA). The location of IHSS Group 400-5 is shown on Figure 1.

This IHSS Group consists of one IHSS and two Potential Areas of Concern (PACs):

- IHSS 400-205 – Sump #3 Acid Site (eastern side of Building 460)
- PAC 400-813 – RCRA Tank Leak in Building 460
- PAC 400-815 – RCRA Tank Leak in Building 460.

Approval of this Data Summary Report constitutes regulatory agency concurrence that IHSS Group 400-5 is a No Further Accelerated Action (NFAA) Site. This information and NFAA determination will be documented in the Fiscal Year (FY) 2005 (05) Historical Release Report (HRR).

2.0 SITE CHARACTERIZATION

IHSS Group 400-5 information for site characterization consists of historical knowledge (DOE 1992-2004) and recent sampling data. There are no pre-accelerated action soil sampling data for IHSS Group 400-5. Historical information is summarized in Section 2.1. Characterization data, collected in accordance with IASAP Addendum #IA-03-14 (DOE 2003), are presented in Section 2.2.

2.1 Historical Information

The following subsections contain historical information on each of the three sites that are included in IHSS Group 400-5. These histories are summarized from the HRR (DOE 1992-2004) and Appendix C of the IASAP (DOE 2001).

2.1.1 IHSS 400-205 – Sump #3 Acid Site (east side of Building 460)

IHSS 400-205 is located on the eastern side of Building 460 at the former location of two acid dumpsters. The dumpsters were operated as Resource Conservation and Recovery Act (RCRA) interim status units during 1986 and 1987 and later used as a

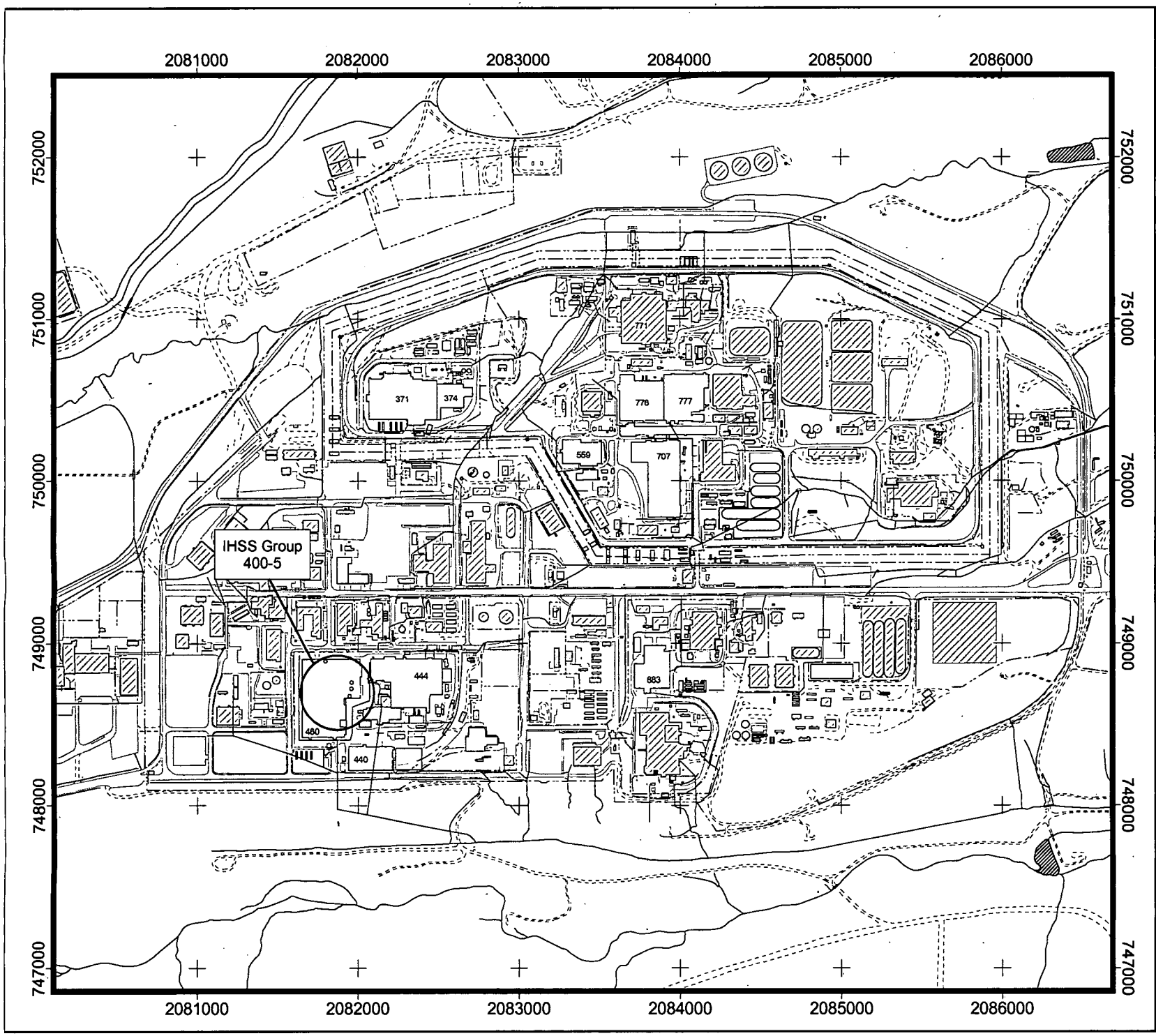

Figure 1
IHSS Group 400-5 Location

KEY

- Paved road
- Dirt road
- Fence
- Pond
- Stream or ditch

Building

- Demolished
- Standing

DRAFT

N
W E
S

500 0 500 Feet

Scale 1:10,000
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: RADMS

Prepared for: KAISER•HILL COMPANY

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90-day waste accumulation area. See Section 3.0 for further discussion of this unit's status. The dumpsters handled a mixture of approximately 80 percent water and 20 percent acid, chiefly nitric acid and nitrad, a combination of hydrofluoric acid and ammonium salts. During an Operable Unit 10 Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI) inspection (date uncertain), it was observed that the dumpsters were disconnected, taken out of service, and triple-rinsed. Documentation of triple rinsing was attached to the dumpsters.

The 250-gallon dumpsters were constructed with 0.1875-inch-thick stainless steel. Each dumpster contained an 18-inch-diameter manhole on the top and a 1-inch-diameter drain fitted with a ball valve in the bottom. Waste transfer lines ran from the process area in Building 460 to a sump or holding tank, then from the sump or holding tank through the concrete wall to the dumpsters. The paired dumpsters were used so that one dumpster could receive waste while the other was being emptied.

The dumpsters were contained within a concrete bermed area with a concrete divider. Each bermed area measures 4 feet (ft), 6.5 inches wide by 8.5 ft long and 12 inches deep, and each bermed area had a 286-gallon capacity. The containment areas cannot be drained into one another, but can be partially drained to the area outside of containment through a drain hole located 1.5 inches above the basin floor.

2.1.2 PAC 400-813 – RCRA Tank Leak in Building 460

During a routine daily inspection in January 1994, approximately 2 gallons of liquid were found in the secondary containment piping associated with a RCRA-regulated process aqueous waste collection tank (RCRA Unit 40.12) in Building 460. The release originated from the gravity-drain piping between a process sink and Sump Tank ST-2 (the ancillary equipment associated with the RCRA unit). For purposes of secondary containment, the waste piping was enclosed within a larger-diameter pipe. The leak occurred under the concrete floor in Room 151 of Building 460. The liquid was characterized as a hazardous waste based on an analysis indicating 19 parts per million (ppm) cadmium and 13 ppm silver.

An engineering evaluation of the integrity of the secondary containment system indicated that there was a possibility that some of the waste had been released to the environment underneath the floor of Building 460 via a breach in the secondary containment pipe that measured approximately 0.25 inch by 0.5 inch in area. The total volume of waste involved in the tank leak included the two gallons discovered in secondary containment plus an unknown amount that may have leaked from secondary containment into the environment.

The RCRA Contingency Plan was implemented and the liquid in the secondary containment was removed and placed into the process waste system on January 12, 1994. The affected piping was immediately taken out of service and temporarily capped to prevent inadvertent use of the system. Alternate means of collection were used for the processes that relied on the capped lines.

The potentially contaminated soil beneath the building was not removed or sampled for several reasons including the following:

- Inaccessibility of soil removal without core drilling through the floor;
- The relatively low level of contaminants in the released hazardous waste (19 ppm cadmium and 13 ppm silver);
- The size of the breach in the secondary containment piping (0.25 inch x 0.5 inch);
- The location of the piping (13.7 ft above groundwater and underneath concrete); and
- No record of previous releases.

2.1.3 PAC 400-815 – RCRA Tank Leak in Building 460

On June 29, 1994, a maintenance person discovered a release of approximately 1,800 gallons of process waste water into the secondary containment pit of Sump Tank ST-5 (RCRA Unit 40.15) located in Room 140 of Building 460. Initial surveillance indicated that the liner in the pit leaked, filling the associated leak-detection sight tube three-quarters full of hazardous process waste water. In addition, approximately 0.5 to 0.75 inch of water was present in the surrounding bermed area. No leakage had been observed during the RCRA custodian's inspection on the previous day.

Sump Tank ST-5 collected Building 460 process waste water that was initially collected in Tank T-3 and then pumped to a roll-filter table prior to collection in Sump Tank ST-5. Sump Tank ST-5 water was then pumped to Collection Tank T-1. These tanks, as well as Collection Tank T-2, are all contained within a concrete bermed area. The concrete is coated with epoxy with the exception of Pit #5 surrounding Sump Tank ST-5, which had a Hypalon liner.

The spilled material was characterized as a hazardous waste because analyses showed that cadmium exceeded the Toxicity Characteristic Leaching Procedure (TCLP) limit. No other metals exceeded TCLP limits or exhibited the characteristic of corrosivity. The source of the cadmium was believed to be from residual nondestructive testing film developer process waste, which was last placed into the process waste system on June 28, 1994. The developer waste water drained to the tank in Pit #2 and was then transferred to Tank T-3.

In response to the spill, all process waste activities in Building 460 immediately ceased and Building 460 Maintenance personnel pumped the tank, pit, and bermed area and then vacuumed the remaining waste, collecting it in RCRA Collection Tanks T-1 and T-2. The final removal of all liquid from under the liner was completed by noon on June 30, 1994. Subsequent inspection of the Hypalon liner indicated three small areas of leakage and two small areas where the liner had separated.

2.2 Accelerated Action Characterization Data

Table 1 summarizes the proposed and actual accelerated action soil sampling and analysis at IHSS Group 400-5. A total of seven soil sampling locations with two depth intervals each were planned for IHSS Group 400-5 as part of IASAP Addendum #IA-03-14 (DOE 2003). Changes in the original sampling design are discussed below. Not included in the actual totals below is one groundwater sample that was analyzed for metals, radionuclides, semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs).

Table 1
IHSS Group 400-5 Sampling and Analysis Summary

IHSS Group	Category	Planned Total	Actual Total
400-5	Number of Sampling Locations	7	4
	Number of Samples	14	8
	Number of Metal Analyses	14	8
	Number of Radionuclide Analyses	14	8
	Number of SVOC Analyses	14	8
	Number of VOC Analyses	7	5

On August 24, 2004, Environmental Restoration (ER) and building personnel conducted a walkdown at Building 460 in order to locate the features identified in IASAP Addendum #IA-03-14 as IHSS 400-205 and PACs 400-813 and 400-815 (DOE 2003). The findings are described in a contact record dated August 25, 2004 (Appendix A).

The location of IHSS 400-205 (Sump #3 Acid Site) was positively identified by Building 460 personnel as an elongate bermed area along the eastern side of Building 460 directly outside of acid process lines in the building. The location is approximately 100 ft north of the area identified as IHSS 400-205 in Figure 2 of IASAP Addendum #IA-03-14.

Based on the relatively small size of the bermed area, the planned five samples for IHSS 400-205 were reduced to three, with one sample being collected from each of the northern, southern, and eastern sides of the berm. Building 460 forms the western side of the bermed area, which was therefore not sampled. This change in sampling design is documented in the contact record of August 25, 2004. The IHSS boundary change will be documented in the FY2005 HRR.

As indicated in Section 2.1, PACs 400-813 and 400-815 are located in Rooms 151 and 140 of Building 460, respectively. A large sump within a bermed area in Room 140 was identified as PAC 400-815. In Room 151, a floor area near a sump was clearly marked with the word "leak." This area was identified a PAC 400-813. In IASAP Addendum #IA-03-14, both PACs are shown as being in the interior of Building 460, but the mapped locations are not exact (DOE 2003). Figure 2 indicates both the locations shown in the IASAP Addendum and the actual locations of these sites.

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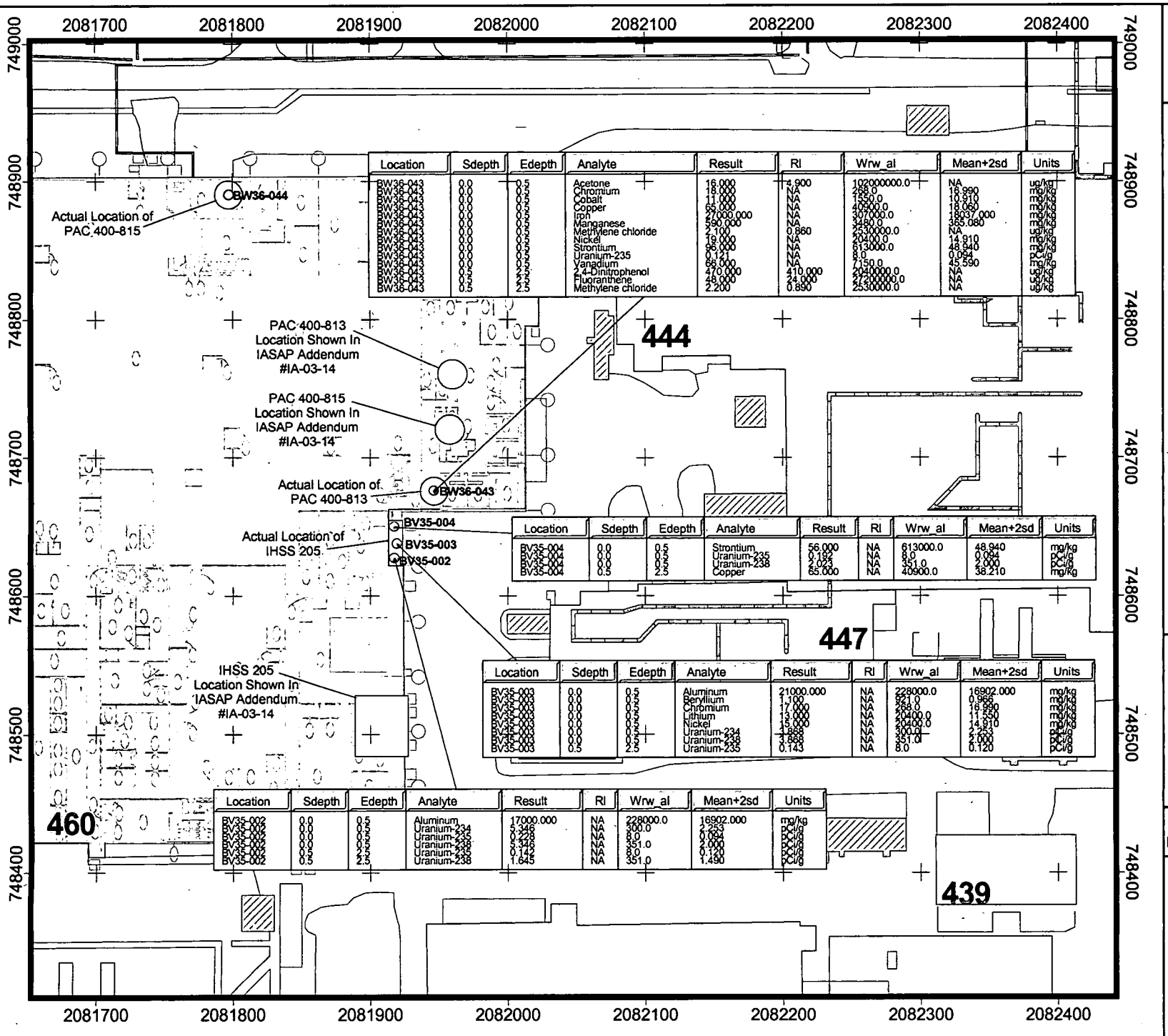

Location	Sdepth	Edepth	Analyte	Result	RI	Wrw_al	Mean+2sd	Units
BW36-043	0.0	0.5	Acetone	16.000	4.900	102000000.0	NA	ug/kg
BW36-043	0.0	0.5	Chromium	18.000	NA	268.0	16.990	mg/kg
BW36-043	0.0	0.5	Cobalt	11.000	NA	1550.0	10.910	mg/kg
BW36-043	0.0	0.5	Copper	65.000	NA	40900.0	18.060	mg/kg
BW36-043	0.0	0.5	Iron	27000.000	NA	307000.0	18937.000	mg/kg
BW36-043	0.0	0.5	Manganese	390.000	NA	3480.0	355.080	mg/kg
BW36-043	0.0	0.5	Methylene chloride	2.100	0.860	2530000.0	NA	ug/kg
BW36-043	0.0	0.5	Nickel	19.000	NA	20400.0	14.910	mg/kg
BW36-043	0.0	0.5	Strontium	96.000	NA	613000.0	48.940	mg/kg
BW36-043	0.0	0.5	Uranium-235	0.121	NA	8.0	0.094	pCi/g
BW36-043	0.0	0.5	Vanadium	58.000	NA	7150.0	45.590	mg/kg
BW36-043	0.0	2.5	2,4-Dinitrophenol	470.000	410.000	2040000.0	NA	ug/kg
BW36-043	0.5	2.5	Fluoranthene	48.000	24.000	27200000.0	NA	ug/kg
BW36-043	0.5	2.5	Methylene chloride	2.200	0.890	2530000.0	NA	ug/kg

Location	Sdepth	Edepth	Analyte	Result	RI	Wrw_al	Mean+2sd	Units
BV35-004	0.0	0.5	Strontium	56.000	NA	613000.0	48.940	mg/kg
BV35-004	0.0	0.5	Uranium-235	0.192	NA	8.0	0.094	pCi/g
BV35-004	0.0	0.5	Uranium-238	2.023	NA	351.0	2.000	pCi/g
BV35-004	0.5	2.5	Copper	65.000	NA	40900.0	38.210	mg/kg

Location	Sdepth	Edepth	Analyte	Result	RI	Wrw_al	Mean+2sd	Units
BV35-003	0.0	0.5	Aluminum	21000.000	NA	228000.0	16902.000	mg/kg
BV35-003	0.0	0.5	Beryllium	1.100	NA	921.0	0.966	mg/kg
BV35-003	0.0	0.5	Chromium	17.000	NA	268.0	16.990	mg/kg
BV35-003	0.0	0.5	Lithium	13.000	NA	20400.0	11.350	mg/kg
BV35-003	0.0	0.5	Nickel	15.000	NA	20400.0	14.910	mg/kg
BV35-003	0.0	0.5	Uranium-234	1.868	NA	300.0	2.253	pCi/g
BV35-003	0.0	0.5	Uranium-238	1.868	NA	351.0	2.000	pCi/g
BV35-003	0.5	2.5	Uranium-235	0.143	NA	8.0	0.120	pCi/g

Location	Sdepth	Edepth	Analyte	Result	RI	Wrw_al	Mean+2sd	Units
BV35-002	0.0	0.5	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg
BV35-002	0.0	0.5	Uranium-234	5.346	NA	300.0	2.253	pCi/g
BV35-002	0.0	0.5	Uranium-235	0.228	NA	8.0	0.094	pCi/g
BV35-002	0.0	0.5	Uranium-238	5.345	NA	351.0	2.000	pCi/g
BV35-002	0.5	2.5	Uranium-235	0.142	NA	8.0	0.120	pCi/g
BV35-002	0.5	2.5	Uranium-238	1.645	NA	351.0	1.490	pCi/g

Figure 2
IHSS Group 400-5 Soil Results
Greater Than Background Means
Plus Two Standard Deviations or RLs

KEY

- Soil sampling locations with results greater than background means plus two standard deviations or RLs
- Groundwater sampling location (no soil results)
- Actual PAC or IHSS
- PAC shown in IASAP Addendum #IA-03-14
- IHSS shown in IASAP Addendum #IA-03-14
- Building 460 floor plan
- New Process Waste Line
- Original Process Waste Line
- Paved road

Building
- Demolished
- Standing

DRAFT

N
W E
S
50 0 50 Feet

Scale 1:1200
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: RADMS

Prepared for: KAISER•HILL COMPANY

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Table 2 outlines all of the sampling locations, and describes deviations from the planned coordinates, sampled media, and analyte suites for all samples. All of the samples are offset significantly from their planned coordinates because they are all biased samples targeting features that were not precisely located in IASAP Addendum #IA-03-14 (DOE 2003). Fortunately the text descriptions and historical data regarding these features were detailed and specific, and all were positively identified.

With the exception of BW36-044, all IHSS Group 400-5 sampling locations were sampled from 0 to 0.5 ft and 0.5 to 2.5 ft below ground surface (bgs). As planned, all soil samples were analyzed for radionuclides, metals, SVOCs, and VOCs.

When sampling was attempted at BW36-044, groundwater entered the sump after the concrete at its base had been cored. This is described in the contact record dated September 8, 2004 (Appendix A). Soil samples could not be collected, but an incidental groundwater sample was collected and analyzed for radionuclides, metals, SVOCs, and VOCs. Results for the groundwater sample indicated no analytes above RFCA groundwater ALs. Copper and zinc were detected at concentrations above background means plus two standard deviations but were well below ALs. Four phthalate esters, including bis(2-ethylhexylphthalate), were detected at low levels. The quantity of water present was not sufficient to impact surface water quality downgradient. The sump at this sampling location will be well below the final grade and therefore direct human exposure is not an issue.

Accelerated action analytical results for IHSS Group 400-5 soil samples are summarized in Table 3 and shown on Figure 2. Only results greater than background means plus two standard deviations (for inorganics) or reporting limits (RLs) (for organics) are presented. All contaminant activities and concentrations are less than RFCA WRW ALs. The data, retrieved from the RFETS Soil Water Database (SWD) on October 22, 2004, are provided on the enclosed compact disc (CD). The CD contains standardized real and quality control (QC) data, including Chemical Abstracts Service (CAS) numbers, analyte names, and units.

2.3 Sums of Ratios

RFCA sums of ratios (SORs) were calculated for the IHSS Group 400-5 sampling locations based on the accelerated action analytical data for the contaminants of concern (COCs). Radionuclide SOR calculations include americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238 when results were greater than background means plus two standard deviations. Table 4 presents the radionuclide SORs. All SORs for radionuclides in surface (0 to 3 ft) soil were less than 1. No SOR is presented for BW36-044 because there are no accelerated action soil data (only incidental groundwater data) for this location.

Nonradionuclide SORs are calculated for all locations with analytical results greater than 10 percent of the WRW ALs, where aluminum, arsenic, iron, manganese, and polyaromatic hydrocarbons are exempted from the 10 percent criterion and the

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Table 2
IHSS Group 400-5 Characterization Sampling Deviations

Location Code	Proposed Northing	Proposed Easting	Actual Northing	Actual Easting	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments
BV35-002	748526.488	2081890.185	748627.116	2081917.608	Surface Soil	0.0 - 0.5	Radionuclides, Metals, SVOCs	Samples collected immediately S of concrete bermed area where acid dumpsters were once located. Offset approx. 100' N and 27' E in order to target actual acid dumpster location.
					Subsurface Soil	0.5 - 2.5	Radionuclides, Metals, SVOCs, VOCs	
BV35-003	748526.488	2081926.019	748637.479	2081919.561	Surface Soil	0.0 - 0.5	Radionuclides, Metals, SVOCs	Samples collected immediately E of concrete bermed area where acid dumpsters were once located. Offset approx. 111' N and 6' W in order to target actual acid dumpster location.
					Subsurface Soil	0.5 - 2.5	Radionuclides, Metals, SVOCs, VOCs	
BV35-004	748485.384	2081926.320	748649.686	2081917.678	Surface Soil	0.0 - 0.5	Radionuclides, Metals, SVOCs	Samples collected immediately N of concrete bermed area where acid dumpsters were once located. Offset approx. 164' N and 8' W in order to target actual acid dumpster location.
					Subsurface Soil	0.5 - 2.5	Radionuclides, Metals, VOCs, SVOCs	
BW36-043	748760.350	2081959.638	748675.690	2081946.490	Surface Soil	0.0 - 0.5	Radionuclides, Metals, SVOCs, VOCs	Biased location offset 85' S and 13' W to target actual location of leaky process waste piping and secondary containment in Room 151. Both intervals were collected in construction sand fill at the indicated depths. The borehole was advanced to 4 ft bgs and no native soil was encountered.
					Subsurface Soil	0.5 - 2.5	Radionuclides, Metals, SVOCs, VOCs	
BW36-044	748720.396	2081958.463	748890.420	2081797.200	Ground-water	0.0 - 0.1	Radionuclides, Metals, SVOCs, VOCs	Biased location offset 170' N, 161' W in order to target actual location of secondary containment pit in Room 140. The sample was collected beneath the concrete in the base of a large sump located within a bermed area in Room 140 of Building 460. Incidental groundwater sample only.

Table 3
IHSS Group 400-5 Results Greater Than Background Means Plus Two Standard Deviations or RLs

Location Code	Actual Northing	Actual Easting	Starting Depth (ft bgs)	Ending Depth (ft bgs)	Analyte	Result	Reporting Limit	Background Mean Plus Two Standard Deviations	WRW AL	Units
BV35-002	748627.116	2081917.608	0.0	0.5	Aluminum	17000.000	NA	16902.000	228000	mg/kg
BV35-002	*748627.116*	*2081917.608*	*0.0*	*0.5*	*Uranium-234*	*5.346*	*NA*	*2.253*	*300*	*pCi/g*
BV35-002	748627.116	2081917.608	0.0	0.5	Uranium-235	0.228	NA	0.094	8	pCi/g
BV35-002	748627.116	2081917.608	0.0	0.5	Uranium-238	5.346	NA	2.000	351	pCi/g
BV35-002	748627.116	2081917.608	0.5	2.5	Uranium-235	0.142	NA	0.120	8	pCi/g
BV35-002	748627.116	2081917.608	0.5	2.5	Uranium-238	1.645	NA	1.490	351	pCi/g
BV35-003	748637.479	2081919.561	0.0	0.5	Aluminum	21000.000	NA	16902.000	228000	mg/kg
BV35-003	748637.479	2081919.561	0.0	0.5	Beryllium	1.100	NA	0.966	921	mg/kg
BV35-003	748637.479	2081919.561	0.0	0.5	Chromium	17.000	NA	16.990	268	mg/kg
BV35-003	748637.479	2081919.561	0.0	0.5	Lithium	13.000	NA	11.550	20400	mg/kg
BV35-003	748637.479	2081919.561	0.0	0.5	Nickel	15.000	NA	14.910	20400	mg/kg
BV35-003	*748637.479*	*2081919.561*	*0.0*	*0.5*	*Uranium-234*	*3.868*	*NA*	*2.253*	*300*	*pCi/g*
BV35-003	748637.479	2081919.561	0.0	0.5	Uranium-238	3.868	NA	2.000	351	pCi/g
BV35-003	748637.479	2081919.561	0.5	2.5	Uranium-235	0.143	NA	0.120	8	pCi/g
BV35-004	748649.686	2081917.678	0.0	0.5	Strontium	56.000	NA	48.940	613000	mg/kg
BV35-004	748649.686	2081917.678	0.0	0.5	Uranium-235	0.192	NA	0.094	8	pCi/g
BV35-004	748649.686	2081917.678	0.0	0.5	Uranium-238	2.023	NA	2.000	351	pCi/g
BV35-004	748649.686	2081917.678	0.5	2.5	Copper	65.000	NA	38.210	40900	mg/kg
BW36-043	748675.690	2081946.490	0.0	0.5	Acetone	16.000	4.9		102000000	µg/kg
BW36-043	748675.690	2081946.490	0.0	0.5	Chromium	18.000	NA	16.990	268	mg/kg
BW36-043	748675.690	2081946.490	0.0	0.5	Cobalt	11.000	NA	10.910	1550	mg/kg
BW36-043	748675.690	2081946.490	0.0	0.5	Copper	65.000	NA	18.060	40900	mg/kg
BW36-043	748675.690	2081946.490	0.0	0.5	Iron	27000.000	NA	18037.000	307000	mg/kg
BW36-043	748675.690	2081946.490	0.0	0.5	Manganese	590.000	NA	365.080	3480	mg/kg
BW36-043	748675.690	2081946.490	0.0	0.5	Methylene chloride	2.100	0.86	NA	2530000	µg/kg
BW36-043	748675.690	2081946.490	0.0	0.5	Nickel	19.000	NA	14.910	20400	mg/kg

Location Code	Actual Northing	Actual Easting	Starting Depth (ft bgs)	Ending Depth (ft bgs)	Analyte	Result	Reporting Limit	Background Mean Plus Two Standard Deviations	WRW AL	Units
BW36-043	748675.690	2081946.490	0.0	0.5	Strontium	96.000	NA	48.940	613000	mg/kg
BW36-043	748675.690	2081946.490	0.0	0.5	Uranium-235	0.121	NA	0.094	8	pCi/g
BW36-043	748675.690	2081946.490	0.0	0.5	Vanadium	66.000	NA	45.590	7150	mg/kg
BW36-043	748675.690	2081946.490	0.5	2.5	2,4-Dinitrophenol	470.000	410	NA	2040000	µg/kg
BW36-043	748675.690	2081946.490	0.5	2.5	Fluoranthene	48.000	24	NA	27200000	µg/kg
BW36-043	748675.690	2081946.490	0.5	2.5	Methylene chloride	2.200	0.89	NA	2530000	µg/kg

Italics indicate the result was not determined by direct analysis but calculated based on high-purity germanium (HPGe) gamma spectroscopy results for uranium-238.

calculation. For IHSS Group 400-5 manganese was the only analyte present at greater than 10 percent of the WRW AL. Thus, nonradionuclide SORs are not presented.

Table 4
RFCA Radionuclide SORs

Location Code	Sample Starting Depth (ft)	Sample Ending Depth (ft)	SOR
BV35-002	0	0.5	0.06151
BV35-002	0.5	2.5	0.02242
BV35-003	0	0.5	0.02391
BV35-003	0.5	2.5	0.01786
BV35-004	0	0.5	0.02976
BW36-043	0	0.5	0.01513

2.4 Summary Statistics

Summary statistics for analytes detected above background means plus two standard deviations or RLs were calculated by analyte for the IHSS Group 400-5 sampling locations, as presented in Tables 5 and 6 for surface and subsurface soil, respectively. For metals, only detections greater than background means plus two standard deviations were used to calculate the detection frequency and average concentration. For other analytes, all detections above the RL are included.

Table 5
Surface Soil Summary Statistics

Analyte	Total Number of Samples Analyzed	Detection Frequency	Average Concentration	Maximum Concentration	Background Mean Plus Two Standard Deviations	WRW AL	Units
Acetone	1	100%	16	16	NA	102000000	µg/kg
Aluminum	4	50%	19000	21000	16902.000	228000	mg/kg
Beryllium	4	25%	1.1	1.1	0.966	921	mg/kg
Chromium	4	50%	17.5	18	16.990	268	mg/kg
Cobalt	4	25%	11	11	10.910	1550	mg/kg
Copper	4	25%	65	65	18.060	40900	mg/kg
Iron	4	25%	27000	27000	18037.000	307000	mg/kg
Lithium	4	25%	13	13	11.550	20400	mg/kg
Manganese	4	25%	590	590	365.080	3480	mg/kg
Methylene chloride	1	100%	2.1	2.1	NA	2530000	µg/kg
Nickel	4	50%	17	19	14.910	20400	mg/kg
Strontium	4	50%	76	96	48.940	613000	mg/kg
Uranium-234	4	50%	4.607	5.346	2.253	300	pCi/g
Uranium-235	4	75%	0.180	0.2277	0.094	8	pCi/g
Uranium-238	4	75%	3.746	5.346	2.000	351	pCi/g
Vanadium	4	25%	66	66	45.590	7150	mg/kg

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Table 6
Subsurface Soil Summary Statistics

Analyte	Total Number of Samples Analyzed	Detection Frequency	Average Concentration	Maximum Concentration	Background Mean Plus Two Standard Deviations	WRW AL	Units
2,4-Dinitrophenol	4	25%	470	470	NA	2040000	µg/kg
Copper	4	25%	65	65	38.21	40900	mg/kg
Fluoranthene	4	25%	48	48	NA	27200000	µg/kg
Methylene chloride	4	25%	2.2	2.2	NA	2530000	µg/kg
Uranium-235	4	50%	0.1424	0.1429	0.12	8	pCi/g
Uranium-238	4	25%	1.645	1.645	1.49	351	pCi/g

3.0 RCRA UNIT CLOSURE

Each of the IHSS/PAC sites in IHSS Group 400-5 has been associated with a RCRA Unit. The status of these units is summarized below.

3.1 PACs 400-813 and 400-815 – RCRA Tank Leaks

PAC 400-813 contains RCRA Unit 40.12 (Sump Tank ST-2), and PAC 400-815 contains RCRA Unit 40.15 (Sump Tank ST-5). These units were both closed on September 16, 1996 in accordance with the "RCRA Closure Plan for the B460 Process Waste System" dated October 19, 1995. These units are no longer subject to RCRA regulation.

3.2 IHSS 400-205 Sump #3 Acid Site

The acid dumpsters at IHSS 400-205 were designated as RCRA Unit 8, which operated as a 90-day waste accumulation area for acid waste consisting mainly of nitric and hydrofluoric acids. According to the Site Master List of RCRA Units, Unit 8 was withdrawn from the RCRA permit as of February 10, 1995 and is no longer subject to RCRA regulation. Given that accelerated action soil data indicate no significant contamination in this IHSS, it is appropriate to document closure of this RCRA Unit at this time. Following is specific justification for NFAA for IHSS 400-205.

The acid dumpsters were designated as an IHSS in recognition of the potential for acid spills. While no actual spills involving this unit are documented, it is possible that minute quantities of acid may have been released to the environment during normal use of the dumpsters (e.g, while switching the waste transfer line from one dumpster to the other, or while the dumpsters were being emptied). Any acid released in this way would spill onto the ground surface in the immediate area and come into contact with concrete or asphalt, and perhaps with the underlying soil. The resulting chemical reactions would cause neutralization of the acid. Concrete can effectively buffer acidity through dissolution of a constituent mineral, portlandite ($Ca[OH]_2$). Naturally occurring constituents of soil that can buffer acidity include calcite (commonly present in Site soils as caliche), and clay minerals such as illite and kaolinite. Reaction kinetics tend to be

slower for acid buffering by clays than by calcite dissolution, but the buffer capacity of clays is nevertheless substantial (Langmuir, 1997).

Low pH represents a hazardous characteristic of acid waste, but when the acid is neutralized, this characteristic is eliminated. In the case of very small (incidental) acid spills associated with waste handling at the acid dumpsters, it is expected that these spills would be neutralized by chemical interaction with soil (and/or concrete) in the immediate area of the dumpsters, and that any metals that may have dissolved in the acid would also be deposited in that area. Surface and subsurface soil data for three sampling locations at the former acid dumpster location indicate no contamination above the WRW ALs, although some metals are present at levels slightly exceeding the background mean plus two standard deviations. It therefore appears that any spills that may have occurred in association with the acid dumpsters (RCRA Unit 8) did not cause any environmental impact that would necessitate further accelerated action at IHSS 400-205.

4.0 SUBSURFACE SOIL RISK SCREEN

The Subsurface Soil Risk Screen (SSRS) follows the steps identified on Figure 3 in Attachment 5 of RFCA (DOE et al. 2003). Screens 2 and 3 are omitted when all COCs are below WRW ALs.

Screen 1 – Are the COC concentrations below RFCA Table 3 WRW Soil ALs?

Yes. As shown in Table 3, there are no COC concentrations or activities greater than the WRW ALs.

Screen 4 – Is there an environmental pathway and sufficient quantity of COCs that would cause an exceedance of the surface water standards?

The quantity of COCs at IHSS Group 400-5 is so minimal that it is highly unlikely that enough contamination originating at this location could migrate via erosion or groundwater into surface water and cause an exceedance of the surface water ALs.

As shown in Table 3, a majority of the contaminants detected in IHSS Group 400-5 are inorganics that are present in surface soil at concentrations that are slightly elevated above background means plus two standard deviations. Copper was detected in surface soil at approximately 3.5 times its background mean plus two standard deviations, and the three isotopes of uranium were all detected in surface soil at approximately 2.5 times background means plus two standard deviations. A handful of other inorganics were detected at concentrations less than 2 times the background means plus two standard deviations. These data indicate that the over all quantity of contaminants present in soil in this IHSS Group is minimal. In the case of BW36-044, incidental groundwater was analyzed instead of soil. The groundwater contained no contaminants above the RFCA groundwater ALs and was not present in large enough quantity to impact surface water.

As established by RFCA Attachment 5, Figure 1, IHSS Group 400-5 is not in an area of high erosion, and therefore the erosional pathway is not significant at this location.

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Although it is possible that contaminants from IHSS Group 400-5 could enter groundwater via dissolution in infiltrating precipitation, the impact would be minimal because the amount of contamination present is minimal. Groundwater beneath IHSS Group 400-5 is within the IA plume and is contaminated with chlorinated solvents, including trichloroethene, tetrachloroethene, and 1,1-dichloroethene. These analytes were not detected in IHSS Group 400-5 and have sources in other areas of the IA. The IA plume is evaluated in the Groundwater Interim Measure/Interim Remedial Action decision document.

5.0 NFAA SUMMARY

Based on analytical results and the SSRS, action is not required, and an NFAA determination is justified for IHSS Group 400-5 given the following:

- Activities and concentrations of COCs were uniformly below RFCA WRW ALs.
- Migration of soil contaminants to surface water is unlikely because little contamination is present and because IHSS Group 400-5 is not located in an area of high erosion, based on RFCA Attachment 5, Figure 1 (DOE et al. 2003).
- Contaminants originating in IHSS Group 400-5 soil are not likely to impact surface water via transport in groundwater because soil contamination levels in IHSS Group 400-5 are very low. Groundwater contamination present beneath IHSS Group 400-5 is part of the IA Plume, which is evaluated as part of the groundwater Interim Measure/Interim Remedial Action (IM/IRA).

Approval of this Data Summary Report constitutes regulatory agency concurrence that IHSS Group 400-5 is an NFAA Site. This information and the NFAA determination will be documented in the FY05 HRR. Ecological factors will be evaluated in the AAESE and the CRA.

6.0 DATA QUALITY ASSESSMENT

The data quality objectives (DQOs) for this project are described in the IASAP (DOE 2001). All DQOs for this project were achieved based on the following:

- Regulatory agency-approved sampling program design (IASAP Addendum #IA-03-14 [DOE 2003]), modified because of field conditions, in accordance with the IASAP (DOE 2001);
- Collection of samples in accordance with the sampling design; and
- Results of the Data Quality Assessment (DQA), as described in the following sections.

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6.1 DQA Process

The DQA process ensures that the type, quantity, and quality of environmental data used in decision making are defensible, and is based on the following guidance and requirements:

- U.S. Environmental Protection Agency (EPA), 1994a, Guidance for the Data Quality Objective Process, QA/G-4;
- EPA, 1998, Guidance for the Data Quality Assessment Process, Practical Methods for Data Analysis, QA/G-9; and
- U.S. Department of Energy (DOE), 1999, Quality Assurance, Order 414.1A.

Verification and validation (V&V) of data are the primary components of the DQA. The final data are compared with original project DQOs and evaluated with respect to project decisions; uncertainty within the decisions; and quality criteria required for the data, specifically precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). Validation criteria are consistent with the following RFETS-specific documents and industry guidelines:

- EPA, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, 540/R-94/012;
- EPA, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, 540/R-94/013;
- Kaiser-Hill Company, L.L.C. (K-H) V&V Guidelines:
  - General Guidelines for Data Verification and Validation, DA-GR01 v2, 2002a
  - V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01 v2, 2002b
  - V&V Guidelines for Volatile Organics, DA-SS01 v3, 2002c
  - V&V Guidelines for Semivolatile Organics, DA-SS02 v3, 2002d
  - V&V Guidelines for Metals, DA-SS05 v3, 2002e; and
- Lockheed Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

This report will be submitted to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Record (AR) for permanent storage 30 days after being provided to the Colorado Department of Public Health and Environment (CDPHE) and/or EPA.

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6.2 V & V of Results

Verification ensures that data produced and used by the project are documented and traceable in accordance with quality requirements. Validation consists of a technical review of all data that directly support the project decisions so that any limitations of the data relative to project goals are delineated and the associated data are qualified accordingly. The V&V process defines the criteria that constitute data quality, namely PARCCS parameters. Data traceability and archiving are also addressed. V&V criteria include the following:

- Chain-of-custody;
- Preservation and hold times;
- Instrument calibrations;
- Preparation blanks;
- Interference check samples (metals);
- Matrix spikes/matrix spike duplicates (MS/MSDs);
- Laboratory control samples (LCSs);
- Field duplicate measurements;
- Chemical yield (radiochemistry);
- Required quantitation limits/minimum detectable activities (sensitivity of chemical and radiochemical measurements, respectively); and
- Sample analysis and preparation methods.

Evaluation of V&V criteria ensures that PARCCS parameters are satisfactory (i.e., within tolerances acceptable to the project). Satisfactory V&V of laboratory quality controls are captured through application of validation "flags" or qualifiers to individual records.

Raw hard-copy data (for example, individual analytical data packages) are currently filed by report identification number (RIN) and maintained by K-H Analytical Services Division (ASD); older hard copies may reside in the Federal Center in Lakewood, Colorado. Electronic data are stored in the RFETS SWD.

Both real and QC data are included on the enclosed CD.

6.2.1 Accuracy

The following measures of accuracy were evaluated:

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- LCSs;
- Surrogates;
- Field blanks; and
- Sample MSs.

Results are compared to method requirements and project goals. The results of these comparisons are summarized for RFCA COCs where the result could impact project decisions. Particular attention is paid to those values near ALs when QC results could indicate unacceptable levels of uncertainty for decision-making purposes.

LCS Evaluation

As indicated in Table 7, LCSs were run for all test methods and laboratory batches in this project except gamma spectroscopy. When the In-Situ Counting System (ISOCS) technique is used for gamma spectroscopy, an internal standard approach is used instead of LCSs. The onsite laboratory that performs gamma spectroscopy is therefore not required to provide LCS data.

The minimum and maximum LCS results are tabulated by chemical for the entire project in Table 8. All LCS recoveries were within tolerances. No records were flagged for poor LCS recovery and no project decisions were affected.

Table 7
LCS Frequency

Test Method	Lab Batch	LCS Run?
ALPHA SPEC	366415	Yes
ALPHA SPEC	366423	Yes
ALPHA SPEC	366425	Yes
SW-846 6010	4252580	Yes
SW-846 6010	4253194	Yes
SW-846 6010	4258142	Yes
SW-846 6010	4258546	Yes
SW-846 6010	4258566	Yes
SW-846 6010	4264483	Yes
SW-846 8260	4259372	Yes
SW-846 8260	MS1 VOA_040902A	Yes
SW-846 8260	MS1 VOA_040908A	Yes
SW-846 8270	4252534	Yes
SW-846 8270	4257603	Yes
SW-846 8270	4258519	Yes

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Table 8
LCS Evaluation Summary

Test Method Name	CAS Number	Analyte	Minimum Percent Recovery	Maximum Percent Recovery
SW-846 8260	71-55-6	1,1,1-Trichloroethane	93.49	124
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	98	107.9
SW-846 8260	79-00-5	1,1,2-Trichloroethane	99	102.9
SW-846 8260	75-34-3	1,1-Dichloroethane	99.64	107
SW-846 8260	75-35-4	1,1-Dichloroethene	98.66	103.2
SW-846 8270	120-82-1	1,2,4-Trichlorobenzene	76	84
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	100.9	104.4
SW-846 8260	95-50-1	1,2-Dichlorobenzene	93	101.7
SW-846 8260	107-06-2	1,2-Dichloroethane	94.5	135
SW-846 8260	78-87-5	1,2-Dichloropropane	100	102.3
SW-846 8260	106-46-7	1,4-Dichlorobenzene	96	100.8
SW-846 8270	95-95-4	2,4,5-Trichlorophenol	84	91
SW-846 8270	88-06-2	2,4,6-Trichlorophenol	81	83
SW-846 8270	120-83-2	2,4-Dichlorophenol	80	87
SW-846 8270	105-67-9	2,4-Dimethylphenol	80	89
SW-846 8270	51-28-5	2,4-Dinitrophenol	60	67
SW-846 8270	121-14-2	2,4-Dinitrotoluene	85	89
SW-846 8270	606-20-2	2,6-Dinitrotoluene	82	85
SW-846 8260	78-93-3	2-Butanone	93.24	101.6
SW-846 8270	91-58-7	2-Chloronaphthalene	74	79
SW-846 8270	95-57-8	2-Chlorophenol	70	77
SW-846 8270	91-57-6	2-Methylnaphthalene	76	88
SW-846 8270	95-48-7	2-Methylphenol	71	79
SW-846 8270	88-74-4	2-Nitroaniline	80	80
SW-846 8270	91-94-1	3,3'-Dichlorobenzidine	55	64
SW-846 8270	534-52-1	4,6-Dinitro-2-methylphenol	72	74
SW-846 8270	106-47-8	4-Chloroaniline	47	53
SW-846 8260	108-10-1	4-Methyl-2-pentanone	91.45	115
SW-846 8270	106-44-5	4-Methylphenol	69	81
SW-846 8270	100-02-7	4-Nitrophenol	83	97
SW-846 8270	83-32-9	Acenaphthene	75	78
SW-846 8260	67-64-1	Acetone	97.18	104.6
SW-846 6010	7429-90-5	Aluminum	90	98
SW-846 8270	120-12-7	Anthracene	80	82
SW-846 6010	7440-36-0	Antimony	87	93
SW-846 6010	7440-38-2	Arsenic	87	93
SW-846 6010	7440-39-3	Barium	97	101
SW-846 8260	71-43-2	Benzene	100.6	103.2
SW-846 8270	56-55-3	Benzo(a)anthracene	79	80
SW-846 8270	50-32-8	Benzo(a)pyrene	79	82
SW-846 8270	205-99-2	Benzo(b)fluoranthene	75	88
SW-846 8270	207-08-9	Benzo(k)fluoranthene	74	75
SW-846 8270	65-85-0	Benzoic Acid	38	60

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Test Method Name	CAS Number	Analyte	Minimum Percent Recovery	Maximum Percent Recovery
SW-846 8270	100-51-6	Benzyl Alcohol	67	80
SW-846 6010	7440-41-7	Beryllium	93	102
SW-846 8270	111-44-4	bis(2-Chloroethyl)ether	58	70
SW-846 8270	39638-32-9	bis(2-Chloroisopropyl)ether	61	73
SW-846 8270	117-81-7	bis(2-Ethylhexyl)phthalate	83	84
SW-846 8260	75-27-4	Bromodichloromethane	96.51	117
SW-846 8260	75-25-2	Bromoform	88.87	100
SW-846 8260	74-83-9	Bromomethane	88.29	95
SW-846 8270	85-68-7	Butylbenzylphthalate	83	83
SW-846 6010	7440-43-9	Cadmium	90	97
SW-846 8260	75-15-0	Carbon Disulfide	83	120.1
SW-846 8260	56-23-5	Carbon Tetrachloride	93.55	119
SW-846 8260	108-90-7	Chlorobenzene	97.64	99.58
SW-846 8260	75-00-3	Chloroethane	99	106.8
SW-846 8260	67-66-3	Chloroform	96.39	115
SW-846 8260	74-87-3	Chloromethane	97.79	119
SW-846 6010	7440-47-3	Chromium	92	100
SW-846 8270	218-01-9	Chrysene	77	80
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	97.09	108
SW-846 6010	7440-48-4	Cobalt	89	96
SW-846 6010	7440-50-8	Copper	92	95
SW-846 8270	84-74-2	Di-n-butylphthalate	84	91
SW-846 8270	117-84-0	Di-n-octylphthalate	78	85
SW-846 8270	53-70-3	Dibenz(a,h)anthracene	83	87
SW-846 8270	132-64-9	Dibenzofuran	83	83
SW-846 8260	124-48-1	Dibromochloromethane	100.5	103
SW-846 8270	84-66-2	Diethylphthalate	83	83
SW-846 8270	131-11-3	Dimethylphthalate	80	83
SW-846 8260	100-41-4	Ethylbenzene	103	107.8
SW-846 8270	206-44-0	Fluoranthene	82	84
SW-846 8270	86-73-7	Fluorene	79	80
SW-846 8270	118-74-1	Hexachlorobenzene	83	88
SW-846 8260	87-68-3	Hexachlorobutadiene	93	110.8
SW-846 8270	87-68-3	Hexachlorobutadiene	86	87
SW-846 8270	77-47-4	Hexachlorocyclopentadiene	60	65
SW-846 8270	67-72-1	Hexachloroethane	74	78
SW-846 8270	193-39-5	Indeno(1,2,3-cd)pyrene	84	86
SW-846 6010	7439-89-6	Iron	92	100
SW-846 8270	78-59-1	Isophorone	68	82
SW-846 6010	7439-92-1	Lead	92	98
SW-846 6010	7439-93-2	Lithium	90	100
SW-846 6010	7439-96-5	Manganese	92	99
SW-846 6010	7439-97-6	Mercury	94	106
SW-846 8260	75-09-2	Methylene chloride	98	102.1
SW-846 6010	7439-98-7	Molybdenum	89	95
SW-846 8270	86-30-6	n-Nitrosodiphenylamine	87	87

Test Method Name	CAS Number	Analyte	Minimum Percent Recovery	Maximum Percent Recovery
SW-846 8270	621-64-7	n-Nitrosodipropylamine	67	78
SW-846 8270	91-20-3	Naphthalene	71	81
SW-846 8260	91-20-3	Naphthalene	92	103.4
SW-846 6010	7440-02-0	Nickel	91	98
SW-846 8270	98-95-3	Nitrobenzene	69	79
SW-846 8270	87-86-5	Pentachlorophenol	65	67
SW-846 8270	108-95-2	Phenol	65	78
SW-846 8270	129-00-0	Pyrene	75	75
SW-846 6010	7782-49-2	Selenium	85	93
SW-846 6010	7440-22-4	Silver	88	97
SW-846 6010	7440-24-6	Strontium	94	100
SW-846 8260	100-42-5	Styrene	99.25	104
SW-846 8260	127-18-4	Tetrachloroethene	96	102.5
SW-846 6010	7440-31-5	Tin	83	89
SW-846 8260	108-88-3	Toluene	103.5	105
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	109.5	121
SW-846 8260	79-01-6	Trichloroethene	93	97.9
SW-846 6010	11-09-6	Uranium, Total	95	99
SW-846 6010	7440-62-2	Vanadium	91	98
SW-846 8260	75-01-4	Vinyl chloride	102	112.3
SW-846 8260	1330-20-7	Xylene	103	105.6
SW-846 6010	7440-66-6	Zinc	87	94

Surrogate Evaluation

The minimum and maximum surrogate results are tabulated by chemical for the IHSS Group 400-5 project in Table 9. Surrogates are added to every sample; therefore, surrogate recoveries impact individual samples only. Unacceptable surrogate recoveries can indicate potential matrix effects. Surrogate recoveries reported above 100 percent may indicate the actual sample results are less than reported. The latter case is environmentally conservative, so no further action is needed. Therefore, only the lowest recoveries were evaluated. For VOCs, surrogate recoveries were good with 84.8 percent being the minimum. For SVOCs, the lowest recoveries in this data set were 51 percent for deuterated nitrobenzene in sample BV35-003B and 52 percent for 2-fluorophenol in BW36-043B. These recoveries are within tolerances. No records were flagged and no project decisions were impacted.

Table 9
Surrogate Recovery Summary

Number of Samples	CAS Number	Analyte	Minimum Percent Recovery	Maximum Percent Recovery
VOC Surrogate Recoveries				
5	460-00-4	4-Bromofluorobenzene	84.8	99
5	17060-07-0	Deuterated 1,2-dichloroethane	102	121.4

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Number of Samples	CAS Number	Analyte	Minimum Percent Recovery	Maximum Percent Recovery
5	2037-26-5	Deuterated Toluene	88	103.6
SVOC Surrogate Recoveries				
8	321-60-8	2-Fluorobiphenyl	49	70
8	367-12-4	2-Fluorophenol	52	61
8	4165-60-0	Deuterated Nitrobenzene	51	62
8	1718-51-0	p-Terphenyl-d14	61	70

Field Blank Evaluation

Detections in field blank quality assurance (QA) samples are listed in Table 10. Detectable amounts of contaminants within field blanks, indicating possible cross-contamination, are evaluated if the same contaminant is detected in the associated real samples. When the real result is less than 10 times the blank result for laboratory contaminants and 5 times the result for nonlaboratory contaminants, the real result is eliminated. Although one blank result indicated toluene cross-contamination may have occurred, project decisions were not affected because all real results for toluene were nondetects and were well below WRW ALs.

Table 10
Field QA Summary

Laboratory	CAS Number	Analyte	Sample QC Code	Detected Result	Result Unit
URS	108-88-3	Toluene	TB	1.5	µg/L

Sample MS Evaluation

The minimum and maximum MS results for IHSS Group 600-4 are summarized by chemical in Table 11. According to the EPA data validation guidelines, if organic MS recoveries are low, the data reviewer may use the MS and MSD results in conjunction with other QC criteria. In this case, the LCS recoveries were checked. For this project, the lowest MS recoveries were 23 percent for benzoic acid and 45 percent for hexachlorocyclopendadiene. Both compounds had better LCS recoveries at 38 percent and 60 percent, respectively. All real results for these compounds were nondetects with detection limits that are orders of magnitude below WRW ALs.

Table 11
Sample MS Evaluation Summary

Test Method Name	CAS Number	Analyte	Minimum Percent Recovery	Maximum Percent Recovery
SW-846 8260	71-55-6	1,1,1-Trichloroethane	123	123
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	101	101

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Test Method Name	CAS Number	Analyte	Minimum Percent Recovery	Maximum Percent Recovery
SW-846 8260	79-00-5	1,1,2-Trichloroethane	98	98
SW-846 8260	75-34-3	1,1-Dichloroethane	107	107
SW-846 8260	75-35-4	1,1-Dichloroethene	102	102
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	73	73
SW-846 8270	120-82-1	1,2,4-Trichlorobenzene	65	65
SW-846 8260	95-50-1	1,2-Dichlorobenzene	83	83
SW-846 8260	107-06-2	1,2-Dichloroethane	139	139
SW-846 8260	78-87-5	1,2-Dichloropropane	101	101
SW-846 8260	106-46-7	1,4-Dichlorobenzene	81	81
SW-846 8270	95-95-4	2,4,5-Trichlorophenol	74	74
SW-846 8270	88-06-2	2,4,6-Trichlorophenol	71	71
SW-846 8270	120-83-2	2,4-Dichlorophenol	74	74
SW-846 8270	105-67-9	2,4-Dimethylphenol	75	75
SW-846 8270	51-28-5	2,4-Dinitrophenol	56	56
SW-846 8270	121-14-2	2,4-Dinitrotoluene	75	75
SW-846 8270	606-20-2	2,6-Dinitrotoluene	72	72
SW-846 8260	78-93-3	2-Butanone	135	135
SW-846 8270	91-58-7	2-Chloronaphthalene	67	67
SW-846 8270	95-57-8	2-Chlorophenol	61	61
SW-846 8270	91-57-6	2-Methylnaphthalene	71	71
SW-846 8270	95-48-7	2-Methylphenol	65	65
SW-846 8270	88-74-4	2-Nitroaniline	70	70
SW-846 8270	91-94-1	3,3'-Dichlorobenzidine	50	50
SW-846 8270	534-52-1	4,6-Dinitro-2-methylphenol	62	62
SW-846 8270	106-47-8	4-Chloroaniline	49	49
SW-846 8260	108-10-1	4-Methyl-2-pentanone	130	130
SW-846 8270	106-44-5	4-Methylphenol	69	69
SW-846 8270	100-02-7	4-Nitrophenol	73	73
SW-846 8270	83-32-9	Acenaphthene	67	67
SW-846 8260	67-64-1	Acetone	153	153
SW-846 8270	120-12-7	Anthracene	70	70
SW-846 8260	71-43-2	Benzene	100	100
SW-846 8270	56-55-3	Benzo(a)anthracene	71	71
SW-846 8270	50-32-8	Benzo(a)pyrene	70	70
SW-846 8270	205-99-2	Benzo(b)fluoranthene	72	72
SW-846 8270	207-08-9	Benzo(k)fluoranthene	65	65
SW-846 8270	65-85-0	Benzoic Acid	23	23
SW-846 8270	100-51-6	Benzyl Alcohol	68	68
SW-846 8270	111-44-4	bis(2-Chloroethyl)ether	54	54
SW-846 8270	39638-32-9	bis(2-Chloroisopropyl)ether	57	57
SW-846 8270	117-81-7	bis(2-Ethylhexyl)phthalate	74	74
SW-846 8260	75-27-4	Bromodichloromethane	118	118
SW-846 8260	75-25-2	Bromoform	102	102
SW-846 8260	74-83-9	Bromomethane	98	98
SW-846 8270	85-68-7	Butylbenzylphthalate	77	77
SW-846 8260	75-15-0	Carbon Disulfide	85	85

Test Method Name	CAS Number	Analyte	Minimum Percent Recovery	Maximum Percent Recovery
SW-846 8260	56-23-5	Carbon Tetrachloride	117	117
SW-846 8260	108-90-7	Chlorobenzene	92	92
SW-846 8260	75-00-3	Chloroethane	101	101
SW-846 8260	67-66-3	Chloroform	115	115
SW-846 8260	74-87-3	Chloromethane	120	120
SW-846 8270	218-01-9	Chrysene	69	69
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	107	107
SW-846 8270	84-74-2	Di-n-butylphthalate	72	72
SW-846 8270	117-84-0	Di-n-octylphthalate	73	73
SW-846 8270	53-70-3	Dibenz(a,h)anthracene	71	71
SW-846 8270	132-64-9	Dibenzofuran	72	72
SW-846 8260	124-48-1	Dibromochloromethane	101	101
SW-846 8270	84-66-2	Diethylphthalate	72	72
SW-846 8270	131-11-3	Dimethylphthalate	72	72
SW-846 8260	100-41-4	Ethylbenzene	96	96
SW-846 8270	206-44-0	Fluoranthene	69	69
SW-846 8270	86-73-7	Fluorene	70	70
SW-846 8270	118-74-1	Hexachlorobenzene	70	70
SW-846 8260	87-68-3	Hexachlorobutadiene	53	53
SW-846 8270	87-68-3	Hexachlorobutadiene	66	66
SW-846 8270	77-47-4	Hexachlorocyclopentadiene	45	45
SW-846 8270	67-72-1	Hexachloroethane	60	60
SW-846 8270	193-39-5	Indeno(1,2,3-cd)pyrene	72	72
SW-846 8270	78-59-1	Isophorone	68	68
SW-846 6010	7439-97-6	Mercury	104	104
SW-846 8260	75-09-2	Methylene chloride	95	95
SW-846 8270	86-30-6	n-Nitrosodiphenylamine	76	76
SW-846 8270	621-64-7	n-Nitrosodipropylamine	64	64
SW-846 8260	91-20-3	Naphthalene	80	80
SW-846 8270	91-20-3	Naphthalene	64	64
SW-846 8270	98-95-3	Nitrobenzene	63	63
SW-846 8270	87-86-5	Pentachlorophenol	60	60
SW-846 8270	108-95-2	Phenol	64	64
SW-846 8270	129-00-0	Pyrene	67	67
SW-846 8260	100-42-5	Styrene	95	95
SW-846 8260	127-18-4	Tetrachloroethene	84	84
SW-846 8260	108-88-3	Toluene	98	98
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	117	117
SW-846 8260	79-01-6	Trichloroethene	93	93
SW-846 8260	75-01-4	Vinyl chloride	105	105
SW-846 8260	1330-20-7	Xylene	93	93

6.2.2 Precision

Sample MSD Evaluation

Laboratory precision is measured through use of MSDs, as summarized in Table 12. Analytes with the highest relative percent differences (RPDs) were reviewed by comparing the highest sample result to the AL. If the highest samples were sufficiently below the AL, no further action is needed. For this project, the analyte with the highest RPD was hexachlorobutadiene at 27.64. Hexachlorobutadiene was not detected in any of the real samples, and detection limits for this analyte were several orders of magnitude below the WRW AL. No project decisions were affected by MSD results with high RPDs.

Table 12
Sample MSD Evaluation Summary

Test Method Name	CAS Number	Analyte	Maximum of Relative Percent Difference
SW-846 8260	71-55-6	1,1,1-Trichloroethane	12.93
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	9.43
SW-846 8260	79-00-5	1,1,2-Trichloroethane	10.63
SW-846 8260	75-34-3	1,1-Dichloroethane	13.10
SW-846 8260	75-35-4	1,1-Dichloroethene	10.23
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	24.10
SW-846 8270	120-82-1	1,2,4-Trichlorobenzene	8.82
SW-846 8260	95-50-1	1,2-Dichlorobenzene	21.51
SW-846 8260	107-06-2	1,2-Dichloroethane	10.24
SW-846 8260	78-87-5	1,2-Dichloropropane	12.09
SW-846 8260	106-46-7	1,4-Dichlorobenzene	22.95
SW-846 8270	95-95-4	2,4,5-Trichlorophenol	2.67
SW-846 8270	88-06-2	2,4,6-Trichlorophenol	2.78
SW-846 8270	120-83-2	2,4-Dichlorophenol	3.97
SW-846 8270	105-67-9	2,4-Dimethylphenol	5.19
SW-846 8270	51-28-5	2,4-Dinitrophenol	13.33
SW-846 8270	121-14-2	2,4-Dinitrotoluene	3.92
SW-846 8270	606-20-2	2,6-Dinitrotoluene	6.71
SW-846 8260	78-93-3	2-Butanone	6.11
SW-846 8270	91-58-7	2-Chloronaphthalene	4.38
SW-846 8270	95-57-8	2-Chlorophenol	9.38
SW-846 8270	91-57-6	2-Methylnaphthalene	8.11
SW-846 8270	95-48-7	2-Methylphenol	7.41
SW-846 8270	88-74-4	2-Nitroaniline	5.56
SW-846 8270	91-94-1	3,3'-Dichlorobenzidine	7.69
SW-846 8270	534-52-1	4,6-Dinitro-2-methylphenol	10.69
SW-846 8270	106-47-8	4-Chloroaniline	5.94
SW-846 8260	108-10-1	4-Methyl-2-pentanone	2.28
SW-846 8270	106-44-5	4-Methylphenol	5.63

Test Method Name	CAS Number	Analyte	Maximum of Relative Percent Difference
SW-846 8270	100-02-7	4-Nitrophenol	9.15
SW-846 8270	83-32-9	Acenaphthene	4.38
SW-846 8260	67-64-1	Acetone	7.46
SW-846 8270	120-12-7	Anthracene	6.90
SW-846 8260	71-43-2	Benzene	12.21
SW-846 8270	56-55-3	Benzo(a)anthracene	4.14
SW-846 8270	50-32-8	Benzo(a)pyrene	6.90
SW-846 8270	205-99-2	Benzo(b)fluoranthene	0.00
SW-846 8270	207-08-9	Benzo(k)fluoranthene	8.82
SW-846 8270	65-85-0	Benzoic Acid	12.24
SW-846 8270	100-51-6	Benzyl Alcohol	5.71
SW-846 8270	111-44-4	bis(2-Chloroethyl)ether	13.79
SW-846 8270	39638-32-9	bis(2-Chloroisopropyl)ether	10.00
SW-846 8270	117-81-7	bis(2-Ethylhexyl)phthalate	3.97
SW-846 8260	75-27-4	Bromodichloromethane	11.20
SW-846 8260	75-25-2	Bromoform	10.23
SW-846 8260	74-83-9	Bromomethane	5.94
SW-846 8270	85-68-7	Butylbenzylphthalate	1.29
SW-846 8260	75-15-0	Carbon Disulfide	14.21
SW-846 8260	56-23-5	Carbon Tetrachloride	12.80
SW-846 8260	108-90-7	Chlorobenzene	16.92
SW-846 8260	75-00-3	Chloroethane	7.62
SW-846 8260	67-66-3	Chloroform	13.01
SW-846 8260	74-87-3	Chloromethane	2.47
SW-846 8270	218-01-9	Chrysene	5.63
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	12.28
SW-846 8270	84-74-2	Di-n-butylphthalate	6.71
SW-846 8270	117-84-0	Di-n-octylphthalate	4.03
SW-846 8270	53-70-3	Dibenz(a,h)anthracene	5.48
SW-846 8270	132-64-9	Dibenzofuran	4.08
SW-846 8260	124-48-1	Dibromochloromethane	13.82
SW-846 8270	84-66-2	Diethylphthalate	4.08
SW-846 8270	131-11-3	Dimethylphthalate	4.08
SW-846 8260	100-41-4	Ethylbenzene	15.38
SW-846 8270	206-44-0	Fluoranthene	6.99
SW-846 8270	86-73-7	Fluorene	2.82
SW-846 8270	118-74-1	Hexachlorobenzene	2.82
SW-846 8260	87-68-3	Hexachlorobutadiene	27.64
SW-846 8270	87-68-3	Hexachlorobutadiene	10.07
SW-846 8270	77-47-4	Hexachlorocyclopentadiene	10.53
SW-846 8270	67-72-1	Hexachloroethane	8.00
SW-846 8270	193-39-5	Indeno(1,2,3-cd)pyrene	5.41
SW-846 8270	78-59-1	Isophorone	7.09
SW-846 6010	7439-97-6	Mercury	8.00

Test Method Name	CAS Number	Analyte	Maximum of Relative Percent Difference
SW-846 8260	75-09-2	Methylene chloride	11.88
SW-846 8270	86-30-6	n-Nitrosodiphenylamine	3.87
SW-846 8270	621-64-7	n-Nitrosodipropylamine	7.52
SW-846 8270	91-20-3	Naphthalene	8.96
SW-846 8260	91-20-3	Naphthalene	20.22
SW-846 8270	98-95-3	Nitrobenzene	9.09
SW-846 8270	87-86-5	Pentachlorophenol	9.52
SW-846 8270	108-95-2	Phenol	7.52
SW-846 8270	129-00-0	Pyrene	5.80
SW-846 8260	100-42-5	Styrene	18.18
SW-846 8260	127-18-4	Tetrachloroethene	19.35
SW-846 8260	108-88-3	Toluene	16.82
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	13.55
SW-846 8260	79-01-6	Trichloroethene	14.00
SW-846 8260	75-01-4	Vinyl chloride	6.45
SW-846 8260	1330-20-7	Xylene	17.65

Field Duplicate Evaluation

Field duplicate results reflect sampling precision, or overall repeatability of the sampling process. The frequency of field duplicate collection should exceed 1 field duplicate per 20 real samples, or 5 percent. This goal is applied to the overall ER project and not on a specific IHSS Group basis. Table 13 indicates duplicate sampling frequencies were greater than 5 percent for all methods.

Table 13
Field Duplicate Sample Frequency Summary

Test Method Name	Sample Code	Number of Samples	Percent Duplicate Samples
ALPHA SPECTROSCOPY	REAL DUP	2 2	100%
GAMMA SPECTROSCOPY	REAL DUP	8 2	25%
SW-846 6010	REAL DUP	8 2	25%
SW-846 8260	REAL DUP	5 2	40%
SW-846 8270	REAL DUP	8 2	25%

The RPDs indicate how much variation exists in the field duplicate analyses. The EPA data validation guidelines state that "there are no required review criteria for field duplicate analyses comparability." For the DQA, the highest RPDs were reviewed. The highest sample concentrations for those analytes were corrected for the associated RPD (Table 14), and the resulting numbers were compared to the ALs. For this project, project decisions were not impacted.

Table 14
Field Duplicate RPD Evaluation Summary

Lab Code	Test Method	Analyte	Maximum Relative Percent Difference
ESTLDEN	SW-846 8260	1,1,1-Trichloroethane	1.77
ESTLDEN	SW-846 8260	1,1-Dichloroethane	1.77
ESTLDEN	SW-846 8260	1,2,4-Trichlorobenzene	1.77
ESTLDEN	SW-846 8270	1,2,4-Trichlorobenzene	2.70
ESTLDEN	SW-846 8260	1,2-Dichloroethane	1.77
ESTLDEN	SW-846 8270	2,4,5-Trichlorophenol	2.70
ESTLDEN	SW-846 8270	2,4,6-Trichlorophenol	2.70
ESTLDEN	SW-846 8270	2,4-Dichlorophenol	2.70
ESTLDEN	SW-846 8270	2,4-Dimethylphenol	2.70
ESTLDEN	SW-846 8270	2,4-Dinitrophenol	2.82
ESTLDEN	SW-846 8270	2-Chloronaphthalene	2.70
ESTLDEN	SW-846 8270	2-Chlorophenol	2.70
ESTLDEN	SW-846 8270	2-Methylnaphthalene	2.70
ESTLDEN	SW-846 8270	2-Methylphenol	2.70
ESTLDEN	SW-846 8270	2-Nitroaniline	2.82
ESTLDEN	SW-846 8270	3,3'-Dichlorobenzidine	6.90
ESTLDEN	SW-846 8270	4,6-Dinitro-2-methylphenol	2.82
ESTLDEN	SW-846 8270	4-Chloroaniline	6.90
ESTLDEN	SW-846 8260	4-Methyl-2-pentanone	4.65
ESTLDEN	SW-846 8270	4-Methylphenol	2.70
ESTLDEN	SW-846 8270	4-Nitrophenol	2.82
ESTLDEN	SW-846 8270	Acenaphthene	2.82
ESTLDEN	SW-846 6010	Aluminum	13.33
ESTLDEN	SW-846 8270	Anthracene	2.82
ESTLDEN	SW-846 6010	Barium	20.29
ESTLDEN	SW-846 8260	Benzene	1.77
ESTLDEN	SW-846 8270	Benzo(a)anthracene	2.70
ESTLDEN	SW-846 8270	Benzo(a)pyrene	2.70
ESTLDEN	SW-846 8270	Benzo(b)fluoranthene	2.70
ESTLDEN	SW-846 8270	Benzo(k)fluoranthene	2.70
ESTLDEN	SW-846 8270	Benzoic Acid	2.82
ESTLDEN	SW-846 8270	Benzyl Alcohol	6.90
ESTLDEN	SW-846 8270	bis(2-Chloroethyl)ether	2.70
ESTLDEN	SW-846 8270	bis(2-Chloroisopropyl)ether	2.70

Lab Code	Test Method	Analyte	Maximum Relative Percent Difference
ESTLDEN	SW-846 8270	bis(2-Ethylhexyl)phthalate	2.70
ESTLDEN	SW-846 8260	Bromodichloromethane	1.77
ESTLDEN	SW-846 8260	Bromoform	1.77
ESTLDEN	SW-846 8270	Butylbenzylphthalate	2.70
ESTLDEN	SW-846 6010	Cadmium	60.16
ESTLDEN	SW-846 8260	Carbon Disulfide	1.77
ESTLDEN	SW-846 8260	Chlorobenzene	1.77
ESTLDEN	SW-846 8260	Chloroform	1.77
ESTLDEN	SW-846 6010	Chromium	18.18
ESTLDEN	SW-846 8270	Chrysene	2.70
ESTLDEN	SW-846 8260	cis-1,3-Dichloropropene	1.77
ESTLDEN	SW-846 6010	Cobalt	16.67
ESTLDEN	SW-846 6010	Copper	16.90
ESTLDEN	SW-846 8270	Di-n-butylphthalate	2.70
ESTLDEN	SW-846 8270	Di-n-octylphthalate	2.70
ESTLDEN	SW-846 8270	Dibenz(a,h)anthracene	2.70
ESTLDEN	SW-846 8270	Dibenzofuran	2.70
ESTLDEN	SW-846 8260	Dibromochloromethane	1.77
ESTLDEN	SW-846 8270	Diethylphthalate	2.70
ESTLDEN	SW-846 8270	Dimethylphthalate	2.70
ESTLDEN	SW-846 8270	Fluoranthene	0.00
ESTLDEN	SW-846 8270	Fluorene	2.70
ESTLDEN	SW-846 8270	Hexachlorobenzene	2.70
ESTLDEN	SW-846 8270	Hexachlorobutadiene	2.70
ESTLDEN	SW-846 8270	Hexachlorocyclopentadiene	2.70
ESTLDEN	SW-846 8270	Hexachloroethane	2.70
ESTLDEN	SW-846 8270	Indeno(1,2,3-cd)pyrene	2.70
ESTLDEN	SW-846 6010	Iron	11.76
ESTLDEN	SW-846 8270	Isophorone	2.70
ESTLDEN	SW-846 6010	Lead	55.71
ESTLDEN	SW-846 6010	Lithium	14.63
ESTLDEN	SW-846 6010	Manganese	22.78
ESTLDEN	SW-846 8270	n-Nitrosodiphenylamine	2.70
ESTLDEN	SW-846 8270	n-Nitrosodipropylamine	2.70
ESTLDEN	SW-846 8260	Naphthalene	1.77
ESTLDEN	SW-846 8270	Naphthalene	2.70
ESTLDEN	SW-846 6010	Nickel	11.11
ESTLDEN	SW-846 8270	Nitrobenzene	2.70
ESTLDEN	SW-846 8270	Pentachlorophenol	2.82
ESTLDEN	SW-846 8270	Phenol	2.70
ESTLDEN	SW-846 8270	Pyrene	2.70
ESTLDEN	SW-846 6010	Strontium	16.95
ESTLDEN	SW-846 8260	Styrene	1.77
ESTLDEN	SW-846 8260	Tetrachloroethene	1.77
ESTLDEN	SW-846 8260	Toluene	1.77

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Lab Code	Test Method	Analyte	Maximum Relative Percent Difference
ESTLDEN	SW-846 8260	trans-1,3-Dichloropropene	1.77
ESTLDEN	SW-846 8260	Trichloroethene	1.77
GEL	ALPHA SPEC	Uranium-234	4.51
GEL	ALPHA SPEC	Uranium-238	35.70
ESTLDEN	SW-846 6010	Vanadium	14.63
ESTLDEN	SW-846 6010	Zinc	10.99

6.2.3 Completeness

Based on original project DQOs, a minimum of 25 percent of ER Program analytical (and radiological) results must be formally verified and validated. Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements. These goals are applied to the overall ER project and not on a specific IHSS Group basis. Table 15 presents the number and percentage of validated records (codes without "1"), the number and percentage of verified records (codes with "1"), and the percentage of rejected records for each analytical method.

Table 15
Validation and Verification Summary

Validation Qualifier Code	Total of CAS Number	Count of Records By Test Method				
		Alpha Spectroscopy	Gamma Spectroscopy	SW-846 8270	SW-846 8260	SW-846 6010
J	13	0	0	0	0	13
J1	11	0	0	0	1	10
JB1	2	0	0	0	2	0
UJ	6	0	0	0	0	6
UJ1	18	0	0	0	15	3
V	557	0	18	312	108	119
V1	279	10	6	104	126	33
Total	886	10	24	416	252	184
Validated	576	0	18	312	108	138
%Validated	65.0%	0.0%	75.0%	75.0%	42.9%	75.0%
Verified	310	10	6	104	144	46
%Verified	35.0%	100.0%	25.0%	25.0%	57.1%	25.0%
%Rejected	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

B-detected in blank; J-result estimated; U-concentration below detection limit; V-validated or verified

6.2.4 Sensitivity

RLs, in units of micrograms per kilogram (µg/kg) for organics, milligrams per kilogram (mg/kg) for metals, and picocuries per gram (pCi/g) for radionuclides, were compared with RFCA WRW ALs. Adequate sensitivities of analytical methods were attained for

all COCs that affect project decisions. "Adequate" sensitivity is defined as an RL less than an analyte's associated AL, typically less than one-half the AL.

6.3 Summary of Data Quality

Out of 886 total records, 576 were validated and 310 were verified. No records were rejected. If additional V&V information is received, IHSS Group 400-5 records will be updated in SWD. Data qualified as a result of additional data will be assessed as part of the CRA process. Data collected and used for IHSS Group 400-5 are adequate for decision making based on ER Program goals.

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Appendix A
Correspondence

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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ER REGULATORY CONTACT RECORD

Date/Time:	August 25, 2004	
Site Contact(s,:	Norma Castaneda,	Annette Primrose
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Agency:	CDPHE	CDPHE

Purpose of Contact: Clarification of the 400-5 IA SAP Addendum #IA-03-14

Discussion

IHSS Group 400-5 is associated with B460. The areas were walked down to locate the PAC areas and identify the appropriate sample locations. Descriptions below are from the IASAP Appendix C. Following the description is a description of the building feature that closely matches the description and the proposed samples at that location.

- **IHSS 205 – Sump #3 Acid Site** is located at the acid solvent dumpsters. The dumpsters were contained within a concrete bermed area with a concrete divider. Each bermed area measures 4 feet, 6.5 inches wide by 8.5 feet long, and 12 inches deep. The dumpsters were previously removed.
  - A concrete, bermed area was located outside Building 460 along the southern half of the eastern wall of the building. This area is adjacent to the nitric acid process lines in the building. Building personnel positively identified this area as the nitric acid dumpster area. The bermed area is roughly the same size as described above.
  - Collect one sample each from the center of the north, east and south sides outside of the berm. These are the only sides where sample collection is possible. Collect 3 samples as described in the IA SAP #IA-03-14 for this IHSS, replacing the 5 original samples.
- **PAC 400-813** - Approximately 2 gallons of liquid were found in the secondary containment piping associated with an aqueous waste collection tank (RCRA Unit 40.12) in Building 460. The piping is located under the concrete floor in Room 151. A breach in the secondary containment was located approximately 2.5 feet from the end of the pipe. The released liquid contained cadmium (19 ppm) and silver (13 ppm).
  - A sump was located in the southeastern part of Room 151. An area on the adjacent flooring was marked with the word leak, and then protected by tape. This is located approximately 2.5 feet from the sump.
  - Collect a sample at this location as described in the IA SAP #IA-03-14 for this PAC.
- **PAC 400-815** - Approximately 1,800 gallons of process waste water were released into the secondary containment pit of Sump Tank ST-5 (RCRA Unit 40.15) located in Room 140 of Building 460.
  - A large sump was located within a bermed area in Room 140 along the west wall of Building 460.
  - Collect a sample at this location as described in the IA SAP #IA-03-14 for this PAC.

Contact Record Prepared by: Annette Primrose

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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ER REGULATORY CONTACT RECORD

Date/Time:	September 8, 2004	
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Purpose of Contact: Clarification of the 400-5 IA SAP Addendum #IA-03-14

Discussion

The sample location for PAC 400-815 is within a large, subfloor sump in a bermed area of Room 140 along the north wall of Building 460. This PAC was caused when approximately 1,800 gallons of process wastewater were released into the secondary containment pit of Sump Tank ST-5 (RCRA Unit 40.15). After the release, sample results indicated elevated cadmium levels were present. The source of the cadmium was believed to be from residual nondestructive testing film developer process waste.

Water began pouring into the sump as soon as the concrete slab was penetrated, as a result, a soil sample was not attainable. The location is not presently accessible to sampling equipment that would allow a soil sample to be collected at a depth equivalent to, and below, the base of the sump.

The water is believed to be groundwater since the sump was dry prior to penetration of the concrete. Consequently, a sample of the water will be obtained and analyzed for COCs, especially cadmium . The groundwater concentrations should indicate if there is a potential for a cadmium source, or impact on groundwater in this area that could potentially affect surface water.

A decision on whether additional soil samples will be collected by D&D will be based on the results of the water sample under the consultative process. It is further agreed that the water data will be provided to the State and directly compared to RFCA Tier I and Tier II ground water action levels.

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Enclosure

Compact Disc Containing Standardized Real and QC Data